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FIFTH-YEAR RESULTS OF DIRECT SEEDING WITH WESTERN REDCEDAR AND ENGELMANN SPRUCE

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Direct seeding tests have been established on a number of areas in northern Idaho and northeastern Washington to determine which sites are suitable for the establishment of western redcedar and Engelmann spruce by seed spot sowing.

Details of the tests and methods and early results have been reported by McKeever (1) and Schopmeyer (2,3,4). Important conclusions in the earlier reports were:

1. The seed spots sown with Engelmann spruce and western redcedar seed were not seriously damaged by seed-eating rodents, due apparently to the small size of the seed. Some increase in establishment was noted on spruce seed spots protected with wire screens, but the gain was attributed partly to reduction of temperature caused by the shading effect of the screens and partly to their effect in retarding erosion.

2. Fall sowing afforded better initial establishment than spring sowing.

The fifth-year results described in this report deal only with fall sowing. A few of the tests are located on areas where rodent populations had been reduced by poisoning, but this is considered to be of no practical importance, in view of the earlier conclusion that such protection is unnecessary.

Western Redcedar

The degree of stocking of direct-seeded western redcedar is rather closely associated with the conditions on the seeding areas (Table 1). Excellent fifth-year stocking resulted from seed sowing on cutover areas and broadcast-burned areas with stable soil and a light or a moderate cover of low vegetation. Intermediate success was obtained on a cutover area with a heavier cover of low vegetation and a broadcast-burned area on a steep slope with sandy and relatively unstable soil. A moderate degree

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of success also resulted from seeding under a dense twenty-five-year-old stand of white pine with a moderate cover of low vegetation. Unsatisfactory stocking resulted on a dense brushfield area and on a cutover area with considerable logging debris and a fairly complete cover of low vegetation.

Two areas on which direct seeding failed or was unsatisfactory by the third year are not shown in Table 1. One area, a ceanothus and willow brushfield on a north slope, failed the first year due mostly to drought on a light soil. The other area, a level bench of sandy soil, broadcast burned just prior to sowing, had an unsatisfactory stocking of 22 percent at the end of the third growing season after seeding. Drought, again, was the principal cause of mortality.

It appears that given a reasonably good site, the two principal factors limiting the success of fall-sown redcedar are low vegetation and soil.

Low vegetation seems to operate not so much through competition for light, space, and moisture, as through the smothering of the tiny, slow-growing redcedar seedlings by dead leaves. The Beal's Butte brushfield area is an extreme example. Most of the five-year-old seedlings are completely covered with willow and other deciduous leaves.

Soil appears to be important in two ways. First, light or sandy soils are too droughty for the short-rooted redcedar seedling to maintain a favorable root penetration-soil moisture balance. Second, the light soils tend to be unstable on steep slopes with a resultant loss of seed spots through both erosion and washing in of soil.

Table 1.--Stocking of spot-sown western redcedar at the end of the fifth growing season

Area	Location	Description	Year sown	Fifth-year stocking: Stocked spots 1/ (Percent)	Fifth-year stocking: Seedlings per stocked spot (Number)
A	Iron Creek, Coeur d'Alene National Forest	North slope, 1938-39 seed tree cutting, hemlock and grand fir felled and slash piled and burned 1939. Little low vegetation.	1940	97	20.8
B	"	East slope, 1938-39 seed tree cutting with hemlock and grand fir in overwood, slash piled and burned 1940. Moderate amount of low vegetation.	1940	76	14.4
C	Sands Creek, Coeur d'Alene National Forest	North slope broadcast burned 1938. Gentle slopes. Moderate amount of low vegetation.	1938	74	7.7
D	Iron Creek, Coeur d'Alene National Forest	West slope, otherwise same as area A. Moderate amount of low vegetation.	1940	70	10.7
E	Deception Creek Coeur d'Alene National Forest	Northwest slope, dense stand of 25-year-old white pine. Moderate amount of low vegetation.	1938	47	8.8
F	Kalispell Creek, Kaniksu National Forest	North slope, broadcast burned 1939. Rather unstable sandy soil.	1939	33	1.9
G	Sands Creek, Coeur d'Alene National Forest	North slope, broadcast burned 1934, planted to white pine spring 1935. Rather heavy, low vegetation.	1938	31	3.0
H	Beal's Butte, St. Joe National Forest	North slope, dense ceanothus and willow brushfield.	1940	24	5.3
I	Frog Creek Coeur d'Alene National Forest	East slope, logged 1936, hemlock and grand fir felled 1937, slash piled and burned, leaving a white pine shelterwood. Rather heavy, low vegetation on parts of the plot.	1939	24	3.9

1/ Seed spots with one or more live seedlings.

Engelmann Spruce

Satisfactory stocking has been obtained on two tests of direct seeding Engelmann spruce without rodent protection on fresh burns. These tests were on north slopes, on Solitaire Creek and Sands Creek, Coeur d'Alene National Forest, clearcut and broadcast burned in 1937 and seeded the fall of the same year; fifth-year stocking was 61 and 68 percent, averaging 64 percent.

At the end of three growing seasons, stocking on a north slope on Slate Creek, Kaniksu National Forest, broadcast burned in 1938 and sown in 1940, was 39 percent - low but nevertheless partially successful. Drought has been the chief cause of mortality. A seeding on a north slope in a six-year-old burn, sown in 1940 on Fish Creek, Clearwater National Forest, failed the first year due to drought. Evidence of the severity of the site was indicated by the general absence of vegetation.

References

1. McKeever, D. G. 1942.
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